File NO-20

25X1 [redacted]

15 December 1966

25X1 To: [redacted]

Subject: AIRCRAFT FUEL TANK CONTAMINATION INVESTIGATION-PRELIMINARY REPORT

25X1 Dear [redacted]

It was brought to our attention recently, that a fuel transfer valve had failed to function causing potential in-flight hazardous condition. Upon investigation of the valve, located in the aircraft fuel tank (#6), it
25X1 was related to us that a brown sticky deposit was found on the valve external surfaces. It was suspected that this deposit could have prevented proper actuation of the float valve.

[redacted]

Samples of this deposit (one in a plastic bag, the other on a fuel sensing line) were forwarded to WPAFB lab for analyses. Infrared spectras of the brown residue exhibited absorption bands typical of aliphatic esters of azelaic and sebacic acids and secondary amide groups (strongest absorption bands in polyamides).

It was initially suspected that the minute fuel insoluble portion of PSJ-67A (lubricity additive) was involved in the formation of the deposit. Samples of PSJ-67A batches 45, 47, and 48 were forwarded
25X1 to APFL from [redacted] The insoluble residue was separated from batches 45 and 47 and infrared spectras performed. Numerous absorption bands in the additive residue also appeared in the brown deposit but since their relative intensities were quite different it was concluded that the unknown material was not formed by the additive residue.

Since the additive was ruled out as a possible contributor, attention was focused on the sealant. Samples of sealant were sent to
25X1 APFL from [redacted] Extractions from cured and uncured sealant were made by exposing sealant to isopropyl alcohol, methyl ethyl ketone (MEK), and fuel at elevated temperatures. Infrared spectras from the resultant residues were similar and identical to a portion of the deposit spectra except for the amide group. Failure to reproduce the amide absorption bands was due to improper temperature environment used during extraction phase of test.

Attached (Atch. 1) is a detailed report on our investigation to date.

ADP has been able to consistently reproduce the deposit in their sealant test rig, using fresh cured sealant for each run. They also claim to know the mechanism by which the deposit is formed and how to prevent the formation by either of the following methods:

a. Decrease percentage of accelerator (catalyst) in sealant mixture.

b. Limit first two flights following application of new sealant to prescribed velocities thus limiting aircraft skin temperatures.

ADP has stated that they will publish a detailed report on their findings and recommendations.

APFL has received additional sealant from [redacted] 25X for research in an effort to reproduce the deposit formations as appearing in the aircraft. Reports will be forwarded when this investigation is completed.

Regards,

[redacted] 25X1

Atch.
a/s

cc: [redacted] 25X1

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